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RAILROAD ACCIDENTS IN THE UNITED STATES AND ENGLAND.

BY H. G. PROUT, EDITOR OF THE "RAILROAD GAZETTE."

THE British Board of Trade reports that in 1892 there were twenty-one passengers killed in train accidents in the United Kingdom. In the same year there were one hundred and sixteen passengers killed in the same class of accidents in the United States.* In the months of August, September and October, 1893, there were at least one hundred and eight passengers killed on the railroads of the United States. The record of these three months is a national humiliation; it must grieve every patriotic citizen, for our railroads are the most remarkable industrial institution of the land, and the one in which a great many of us take the most pride. But the normal record, if it is shown by the figures of 1892, is bad enough; that is, $5\frac{1}{2}$ times as many passengers are killed in the United States as in the United Kingdom in a normal year. Apparently the matter will stand looking into. I propose to take up the inquiry under two heads: (1) Do we habitually kill more passengers than the Englishmen, and why? (2) Did we kill more than the average in the last three months of the World's Fair, and why?

Let us start with the table on the next page compiled from reliable statistics, giving data for the United Kingdom and the United States.

* The statistics for 1892 must be taken from the *Railroad Gazette*, as only an abstract of those of the Interstate Commerce Commission is yet out. They are imperfect, and subject to some correction, but are accurate enough for comparison. It must be borne in mind that we are speaking now of train accidents only—that is, accidents in which moving trains were involved and of casualties to the occupants of moving trains. This class of casualties is only a small part of the total, but is the only one which directly concerns the passenger.

(1)	Passengers killed.		Millions of passenger journeys for one passenger killed.		Millions of train-miles for one passenger killed.	
	(2) U. K.	(3) U. S.	(4) U. K.	(5) U. S.	(6) U. K.	(7) U. S.
1887.....	25	207	29.3	2.1	11.3	3.1
1888.....	11	163	67.5	2.7	26.5	4.0
1889.....	88	108	8.8	4.6	3.4	6.6
1890.....	18	172	45.4	2.9	17.4	4.6
1891.....	5	177	169.1	3.1	64.7	4.7
1892.....	21	116	43.1	4.9	15.6	6.3
Average.....	28	158	60.5	3.8	23.1	5.0
Ratios		5.6		16		4.6

From the averages of columns (2) and (3) we find 5.6 times as many passengers killed in the United States in six years as in the United Kingdom. But that proves nothing unless we know how many passengers were carried in the two countries. Columns (4) and (5) give us that measure. Those columns give the millions of passengers carried for each one killed. That is, in the United Kingdom there were $60\frac{1}{2}$ million people who made one journey for one killed, and in the United States $3\frac{8}{10}$. In other words considering only the number of journeys and not the distance travelled it was 16 times as safe to travel by rail in the United Kingdom as in the United States. But here comes in a serious error. The passenger movement is not measured by the number alone but by the number and distance. For example, 10 persons, travelling 100 miles each, make 1,000 passenger-miles, and so do 100 persons travelling 10 miles each; and in each case the danger of accident is about equal. But the English never report the fundamental units of work, the passenger-mile and the ton-mile, while the Americans always do. The want of these units vitiates the English railroad statistics, and this shows how worthless columns (2) and (3) and columns (4) and (5) are for comparison. The average passenger journey in the United States is a good deal longer than in England; therefore the ratio of 16 shown by (4) and (5) is too great.

In columns (6) and (7) I have tried to get another basis of comparison. Those columns show the *millions* of miles made by all trains in both countries for one passenger killed. I have included freight trains as well as passenger, for the danger to passengers increases with the movement of freight trains. We see that in England $23\frac{1}{4}$ million miles were run by trains of all classes for one passenger killed, and in the United States 5 millions. Or, by this standard, it appears to have been more than

$4\frac{1}{2}$ times as dangerous to travel in the United States as in the United Kingdom.

And now the reader can take his choice. It may be five times as dangerous to travel by rail in the United States as in the United Kingdom, or it may be 16 times ; not having the passenger-mile unit we can only guess, and we should guess wildly. But there can be no doubt that the danger is much greater here than there. Why ?

December 31, 1892, there were in the United Kingdom 19,288 miles of railroad open for passenger traffic, and in the United States there were 175,233 miles. The British railroads cost about \$200,000 a mile; the American cost about \$50,000.* Safety is not in direct proportion to cost, but the two are closely allied. Again, in 1890, we had 375 inhabitants to one mile of railroad, and in 1891 England had 1,875 inhabitants to one mile of railroad ; we ran 12.6 train miles for each inhabitant, and in England 7.1 train miles were run for each inhabitant. That is, the public accommodation as measured by train-miles run was 1.8 times as great, and as measured by miles of railroad was five times as great here as there. Again, the average charge for hauling one ton of freight one mile is 0.967 cent in the United States, and probably between 2 and $2\frac{1}{2}$ cents in England. The failure of the Englishmen to report the unit of traffic, the ton-mile, makes this last figure uncertain, but the range here given is accepted by the best authorities. Again, the average passenger fare in the United States is undoubtedly lower than in England, but this is a vexed and complicated subject, too long to go into here.

The meaning of all this is that you cannot eat your cake and have it. You cannot have about as many miles of railroad as all the other nations of the earth together, more miles per head than any other people, more train service than any other people, and cheaper freight rates than any one else in the world, and at the same time have more of the elements of safety than any one else. If the English standard had been enforced here half or three-quarters of our railroads (to jump at a figure) could not have been built. We have allowed investors to build railroads and work them when and where and how they chose, and one result

* The cost per mile is not a matter capable of exact determination. The usual figure of \$60,000 a mile is obtained by counting certain securities twice. The Interstate Commerce Commission gives the total stock and debt as \$60,942 per mile in 1891.

has been far the boldest and most energetic creation of a transportation system that mankind has ever attempted, and much the most wonderful development of a nation that history has ever known. Another result has been a quality of construction, equipment and operation that, to put it mildly, is not the safest in the world. All the facts and conditions must be looked at together; so looked at that they are a splendid example of the blessings and penalties of liberty. There is no question in my mind that in this instance the sum of the blessings vastly outweighs the sum of the penalties.

But this is general; I set out to say specifically why we kill more passengers than the English,—having shown that we do. Of the 19,288 miles of railroad open for traffic in the United Kingdom in 1891, 11,043 miles, or fifty-seven per cent. was double track; in the United States about five and one-half per cent. is double track. The absolute block system is used on 17,343 miles, or ninety per cent. of the railroads of the United Kingdom; in the United States the block system, absolute or permissive, is used on about five per cent. In the United Kingdom ninety-four per cent. of all junctions, crossings, turnouts, and passing and yard switches used by passenger trains are protected by interlocked signals. In the United States there are no records from which it is possible even to estimate the amount of such protection; but while it is considerable absolutely, it is very small relatively. But double tracks, block signals and interlocked signals at switches and crossings will prevent collisions except in the rare cases when an engineman disregards a signal, or from some defect in apparatus cannot stop his train at a signal; and collisions are about forty-six per cent. of all our train accidents.

In car and engine equipment the English have no advantage over us. On the contrary their lighter cars are more easily crushed in a wreck, their cars and tenders are more easily derailed, and their brake apparatus is on the whole probably inferior to ours. But their track is beyond question better. The best American track is safe enough. For final economy in maintenance, roads of heavy traffic may find it worth while to raise their track above the best of present standards, but not for safety alone. But that is not true of the average track, and doubtless more than 10 per cent. of our accidents are from defects of road.

A great deal is said in the newspapers about defective discipline as a cause of train accidents in the United States. There are no classified statistics that will give any just measure of the number due to this cause. The *Railroad Gazette* statistics, which are the only attempt at such a classification, attribute five per cent. of all derailments for the last six years to negligence in operation. Let us add to this *all* the collisions (obviously a violent forcing of facts to get a theory), and we may charge fifty-one per cent. of all train accidents to negligence. The British Board of Trade attributes forty-two per cent. of all the accidents in the United Kingdom in the last eleven years to "negligence, want of care, or mistakes of officers or servants." If now we treat the English statistics as we did the American, and add all the other causes which produced collisions, we have fifty-eight per cent. chargeable to negligence in the United Kingdom as against fifty-one per cent. in the United States. This is a pretty rude way of getting at the relations of things, but so far as it goes it confirms the opinion I have long held that the American railroad officer or employee is quite as vigilant, skilful and faithful as the Englishman.

And now we may sum up. We do habitually kill more passengers than the English, and we do so because they have, per unit of railroad line, more than ten times as much double track as we have, eighteen times as much block signaling, very much more interlocking of switches and signals and considerably better average track.

I have not mentioned the dreadful loss of life at street and highway crossings, and the slaughter of trespassers on the right of way, because that is entirely another branch of the subject. In casualties of that sort we have a specialty, and are quite beyond comparison.

If my facts and conclusions are correct (and if they are not, I trust that some one will set me right), we have reduced the reasons for the greater safety of railroad travel in England to a few simple physical facts. It has also been made tolerably clear why these facts exist; that is, we get what we have been willing, or able, to pay for. One of Charles Reade's characters says of the English courts "they sell you justice prime but dear." Much the same thing can be said of transportation on the English railroads. The quality of the service is first rate, and so is the price. We

have needed more service in proportion to the population, and cheaper service, than the inhabitants of an old and thickly-settled country, where the distances are short, and we have got it; but we have had to pay for it some way. One of the ways has been with our legs and arms, not to mention vital organs. It has been a commercial transaction, or, if you choose, a colossal real-estate speculation, and the sooner we clear our minds of sentimentality in talking about our railroads, and legislating about them, the sooner we shall learn what the real evils are and the way to remedy them.

It will be asked if we have not come to that place in developing our railroad system where a change in policy should begin; if we have not come to the place where safety should precede amount and economy of service. Certainly we have come to that place and the change *has* begun. With growing density of traffic on the more important railroads, double tracking goes on year after year and in increasing ratio. Signals of both sorts, that is, block signals and interlocked switch signals, are being introduced rapidly on lines of thin as well as heavy traffic, and increasing attention is paid to other means of safety. At the moment when I write the Safety Appliance Committee of the American Railway Association is sitting in New York to deliberate on the best means of extending the use of the block system. The American Railway Association is the most authoritative association of operating officers in America. Its consideration of block signaling is by no means a new thing, prompted by recent accidents, but has been going on carefully and systematically for two or three years. The gentlemen who compose the committee are confronted by a complicated set of conditions which are not merely mechanical, but economical and diplomatic. They approach the subject committed to them with zeal and knowledge and are impelled by the most powerful motives that actuate men. We may rest in confidence, therefore, that they will advance the matter of better signaling as fast as it can be done under the given conditions. This body and others, notably the Master Car-Builders' Association, have given a great deal of attention to other appliances, and to methods of moving trains, with a view to greater safety, and have advanced the art of railroading immensely. They are still unremitting in this work.

There are two great forces working to make railroad travel

safer: (1) The wish to make money from operation, and (2) public opinion as embodied in laws or expressed in various ways. No one who has not been in close touch with the control of railroads realizes the pressure on operating officers to save money. Rates fall and wages rise. The laws of the States and the nation have made it impossible to keep up rates; various forces make it impossible to reduce wages, and the railroads are between the devil and the deep sea. The profits of railroad working have fallen until more than sixty per cent. of the railroad securities of the country pay no dividend whatever, and the payment on total debt, stock, bonds, floating debt and obligations of all descriptions is only a trifle over three per cent. per annum. This condition is getting worse rather than better. So there is the greatest possible inducement to save money. If the use of safety appliances can be shown to be a means of economy they will be used. If they are not a means of economy they cannot be used, except on a few favored railroads. Fortunately, as traffic increases we gradually approach the line where it is cheaper to use block signals and interlocked switch signals than not to use them. When that line is reached in the history of any given railroad company is always somewhat a matter of conjecture. The line does not stand up before men's eyes, but can be found only by experiment.

Shall we then trust to the enlightened self interest of the railroads to make travel as safe as all the conditions will permit, or shall we use the second of the great forces and make legislation more special and more stringent? We may trust to the newspapers to remind the railroads of their delinquencies, whatever happens, and therefore we have only to consider the expression of public opinion in law. This is a very big question, indeed, too big to be thrashed out at the end of a magazine article; but a few suggestions may not be out of place.

For the sake of brevity, I shall have to state as true a proposition that it is hard to prove, that may be incapable of proof, but that I believe to be true. It is that any attempts to control by special laws the methods of working railroads will in the end do more harm than good. They will transfer responsibility from the railroad officers to the law-makers, the more specific the law the more complete the transfer. They will impede development by alarming investors, as has invariably been the case where the States have undertaken to control rates. They will substitute

for intelligent self-interest the perfunctory and arbitrary methods of bureaus. Of course, this is all a matter of degree. A little State control will do little harm and will sometimes do good. Much State control may do more good and will do more harm. But the kernel of the matter is that mankind does best when most let alone. One of our oldest and biggest railroads was long controlled very absolutely by one man, and for years no passenger was killed in one of its trains. The president's method was simple. If an accident happened all those immediately concerned were dismissed at once and without a hearing. It was rude railroading, but there was no wire-drawing and hair-splitting about discipline. Perhaps after all the best way for the State to treat the railroads in this matter of safety would be to make them pay high for loss of life and limb, and to prosecute vigorously, in the criminal courts, the individuals directly responsible for any accident.

It is not likely that the policy of the States or of the nation will be directed by such rank "individualism" as I preach. It is more likely that the notion of public control will spread and prevail for a time. In this case we could not do better, probably, than to follow pretty closely the Massachusetts commission law, modifying it a little, and to choose the commissioners to administer it from some such group of men as furnish the British Board of Trade Inspectors. This law would make it the duty of the commissioners to investigate all grave accidents thoroughly and promptly and to report upon them fully and publicly. It would give them power to call witnesses and to make them testify under oath, and to produce all records. The British Inspectors are retired officers of the Royal Engineers. They are men of education, of social standing, who cannot afford to be corrupt, and who have a safe and honorable position in the world. As professional soldiers, they are trained to a high sense of public duty. Our commissioners could be drawn from a similar class of men if the pay was good and the tenure of office long. A stern and fearless investigation of an accident, by such men, and *publicity* of the findings would be enough. No railroad could afford to ignore the warnings, or to be followed into the courts by the reports, of such a commission. In fact, this is exactly the kind of work that the Massachusetts Commission has done for a long time, and with great thoroughness and intelligence. The

New York Commission and the commissions of other States have also done the same kind of work, but not so well. The results of this work, especially in Massachusetts, have often been seen in permanent improvements.

Little space is left for the second topic, the World's Fair accidents ; but after all there is little that is special or peculiar to say of them. It is a fact that in August, September and October, 108 passengers were killed, that the average for three months, taking the six years' statistics already given, would be 53, and that therefore the mortality was twice the average. It is a fact, too, that most of the fatal accidents involved special trains or extra sections of regular trains, and that all but three of them were in what we may call World's Fair territory. All but one were collisions and must be classed under accidents due to negligence in operation. All but the Chester Bridge accident came from those derangements which follow a greatly increased and an unusual traffic. They may be traced to long hours and hard work by all the operating staff, from general managers to flag-men, or to the necessity for putting men at a kind of work with which they were not familiar, or to both. Who is responsible for such a condition of things ? The railroad officers foresaw the danger, but some of them could not beg or borrow money for more than their daily needs, and all of them spent very liberally, according to their means, in preparing for the Fair. And then arose the question of the proper policy of the roads as to the World's Fair rates. On one side stood the press and the public demanding reduced rates, some demanding even so low a rate as one dollar from New York to Chicago, and proving that it would pay the railroads to carry passengers at any rate, and that it was their duty to do so whether it would pay them or not. On this side also was enlisted the influence of certain railroad managers anxious to stimulate a big traffic. On the other side were those men of judgment and knowledge who feared the results which have actually come. It is easy to say that they should have stood out more resolutely than they did, but the public would never have been satisfied until the matter had been carried to demonstration. The demonstration was frightfully costly in money and in lives ; let us hope that the lesson will not be lost either by the railroads or the public.